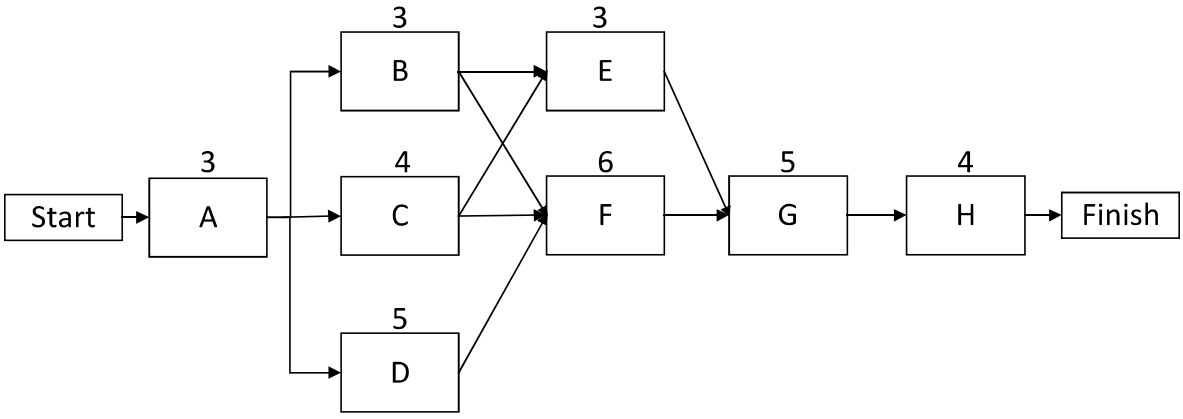
Practice 2

Here is a table of the network diagram that you will need to draw out and answer the following questions:

Activity	Preceding Activity	Durations(in days)
Start		0
A	Start	3
B	A	3
C	A	4
D	A	5
E	B, C	3
F	B, C, D	6
G	E, F	5
H	G	4
Finish	H	0

1. What is the critical path?
2. What is the slack on activity C?
3. What is the late start on activity F?
4. What happens if B is increased to 7 days?

Your first task would have been to draw the diagram as follows:



Make a box for Start and then follow the table to link the activities. Next, we will find all the paths:

1. Start, A, B, E, G, G, H Finish = 18
2. Start, A, B, F, G, H, Finish = 21
3. Start, A, C, E, F, G, H, Finish = 19
4. Start, A, C, F, G, H, Finish = 22
5. **Start, A, D, F, G, H, Finish = 23**

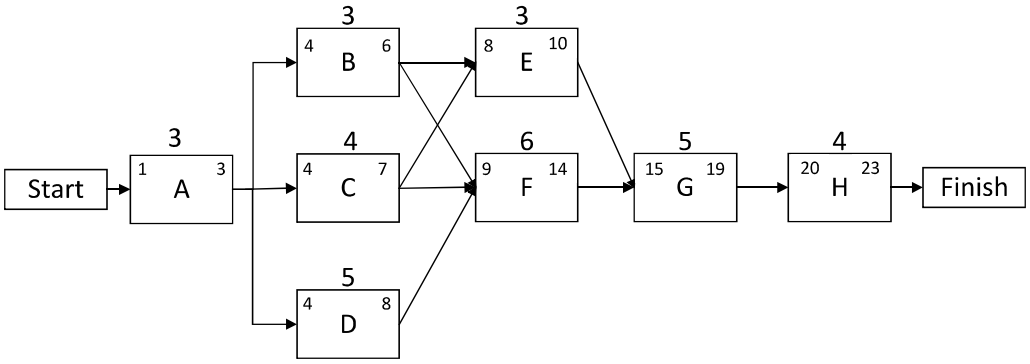
The critical path is Start, A, D, F, G, H, Finish. That is the longest path on the diagram.

Next, we will do the forward and backwards passes as follows:

Forward Pass:

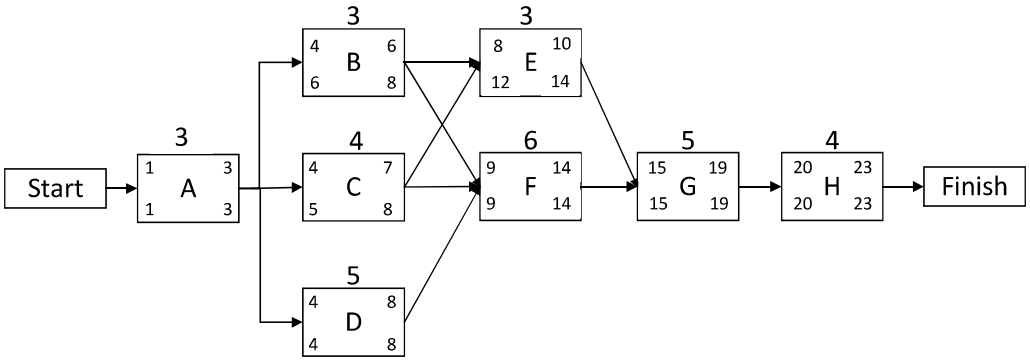
- On A, make the ES 1 because it starts day one. The EF would be 3. That you can get from the formula: 1 + 3 – 1 = 3
- On B, make the ES 4 because it will start the day after A. The EF would be 6. That you can get from the formula: 4 + 3 – 1 = 6
- On C, make the ES 4 because it starts one day after A. The EF would be 7. That you can get from the formula: 4 + 4 – 1 = 7
- On D, make the ES 4 because it starts one day after A. The EF would be 8. That you can get from the formula: 4 + 5 – 1 = 8
- On E, make the ES 8 because it starts one day after C, which is the longest of B and C. The EF would be 10. That you can get from the formula: 8 + 3 – 1 = 10
- On F, make the ES 9 because it starts one day after D, which is the longest of B, C, and D. The EF would be 14. That you can get from the formula: 9 + 6 – 1 = 14
- On G, make the ES 15 because it starts one day after F. The EF would be 19. That you can get from the formula: 15 + 5 – 1 = 19
- On H, make the ES 20 because it starts one day after G. The EF would be 23. That you can get from the formula: 20 + 4 – 1 = 23

The diagram should like the one below. We still cannot answer all the questions without doing a backwards pass



Backward Pass

- On H, make the LF 23, since that is the latest the project can be done. The LS will be 20. That you can get using the formula of 23 – 4 + 1 = 20.
- On G, make the LF 19, since H will late start on 20. The LS will be 15. That you can get using the formula of 19 – 5 + 1 = 15.
- On F, make the LF 14, since G will late start on 15. The LS will be 9. That you can get using the formula of 14 – 6 + 1 = 9.
- On E, make the LF 14, since G will late start on 15. The LS will be 12. That you can get using the formula of 14 – 3 + 1 = 12.
- On D, make the LF 8, since F will late start on 9. The LS will be 4. That you can get using the formula of 8 – 5 + 1 = 4.
- On C, make the LF 8, since E will late start on 9. The LS will be 5. That you can get using the formula of 8 – 4 + 1 = 5.
- On B, make the LF 8, since E will late start on 9. The LS will be 6. That you can get using the formula of 8 – 3 + 1 = 6.
- On A, make the LF 3, since D will late start on 4. The LS will be 1. That you can get using the formula of 3 – 3 + 1 = 1.



The answers to the questions are as follows now that we have the full diagram:

1. **What is the critical path?**
   The critical path is Start, A, D, F, G, H, Finish = 23
2. **What is the slack on activity C?**
   The slack of C is one day, since LF-EF or 8 – 7 = 1 or LS-ES or 5 – 4 = 1. This means that you can delay activity C by one day and still have it not affect the project schedule.
3. **What is the latest we can start activity F?**
   Day 9
4. **What happens if B increases to 7 days?**
   Increasing B to 7 days would change the critical path to Start, A, B, F, G, H, Finish. The new end would be on day 25 instead of day 23.

Here is a table with just the formulas you will need to know for the exam:

Term	Description	Formula
Budget at Completion (BAC)	Original budget of the project.	None, just the original budget.
Planned Value (PV)	Amount of money worth of work we that should have been done on the project.	PV= Planned % Complete x BAC
Earned Value (EV)	Amount of money worth of work you actually did on the project.	EV= Actual % Complete x BAC
Actual Cost (AC)	Amount of money you already spent on the project	None, just the amount already spent on the project.
Cost Variance (CV)	The difference between the work done and money spent. This value should be positive for under budget. **Negative values indicate over budget**	CV = EV - AC
Cost Performance Index (CPI)	The rate of how we are spending to actually earning on the project. **This value should be 1 and over for projects under budget.**	CPI = EV / AC
Schedule Variance (SV)	The difference between the amount of work we should have done vs. the amount actually done. This value should be positive for ahead of schedule. **Negative values indicate behind schedule**	SV = EV - PV
Schedule Performance Index (SPI)	The rate of how we are meeting the project schedule. **This value should be 1 and over for a project to be ahead of the schedule.**	SPI = EV / PV
Estimate at Completion (EAC)	Forecasting the total cost of the project at the end based on the current spending rate of the project.	EAC = BAC / CPI
Estimate to Completion (ETC)	Forecasting the amount that will be needed to complete the current project based on the current performance.	ETC = EAC - AC
Variance at Completion (VAC)	The difference between the original budget and new forecasted budget. This value should be positive for projects that may end at or under budget	VAC = BAC - EAC
To-Complete Performance Index (TCPI)	The performance that needs to be met to finish the project within the budget.	TCPI = (BAC – EV) / (BAC – AC)
Earned Valued Memorization Chart		